Sample Paper 15

Class X 2026-27

Science (086)

Time: 3 Hours **Max. Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some-questions. A student is expected to attempt only one of these questions.

SECTION-A

1. What is the muscular wall that separates the right and left sides of the human heart, preventing the mixing of oxygenated and deoxygenated blood?

(a) Valve (b) Atrium
(c) Ventricle (d) Septum

2. The main thinking part of the human brain, which is the site of learning, memory, intelligence, and voluntary actions, is the:

(a) Cerebellum (b) Cerebrum
(c) Medulla (d) Pons

3. The malarial parasite, Plasmodium, exhibits a specific type of asexual reproduction where a single parent cell divides into many daughter cells simultaneously. This process is known as:

(a) Budding (b) Binary Fission
(c) Multiple Fission (d) Fragmentation

4. Mendel's experiments with pea plants led to the formulation of several laws of inheritance. Which law states that alleles for different traits are inherited independently of one another?

(a) Law of Dominance (b) Law of Segregation
(c) Law of Independent Assortment (d) Law of Unit Factors

5. Ozone is a molecule that plays a crucial role in protecting life on Earth. What is the correct chemical formula for an ozone molecule?

(a) O (b) O_2
(c) O_3 (d) CO_2

6. Consider the following statements about the parts of a typical flower:

(i) The stamen is the male reproductive part, consisting of the anther and filament.
(ii) The pistil (or carpel) is the female reproductive part, consisting of the stigma, style, and ovary.
(iii) Petals are often brightly coloured to attract insects for pollination.
(iv) Sepals are the primary reproductive organs of the flower.

Which of the above statements are correct?

(a) (i) and (ii) only (b) (i), (ii), and (iii)
(c) (iii) and (iv) only (d) All are correct.

7. The human excretory system removes metabolic wastes from the body. What is the main nitrogenous waste product found in human urine?
(a) Ammonia
(b) Uric acid
(c) Creatine
(d) Urea

8. **Assertion (A) :** Very little digestion takes place in the large intestine.
Reason (R) : The primary function of the large intestine is the absorption of water from undigested food.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

9. **Assertion (A) :** Geographical isolation of a population can lead to speciation.
Reason (R) : The separated population accumulates different genetic variations over time, which can lead to it becoming reproductively incompatible with the original population.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

10. Aquatic animals like fish have a much faster rate of breathing compared to terrestrial animals. Provide a scientific reason for this observation.

11. A. What is the function of the enzyme salivary amylase? Where is it found, and what would happen to starch digestion if this enzyme were absent?

OR

B. What are the two main conducting tissues in plants? Name the substance that each of them transports.

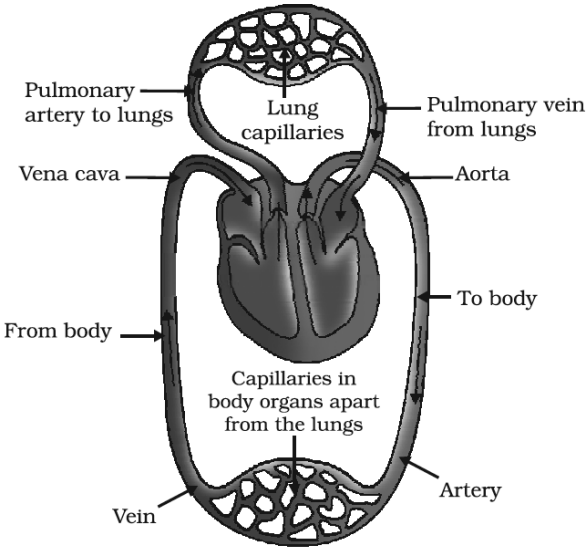
12. What are producers, consumers, and decomposers? Give one example of each from a forest ecosystem.

13. Tabulate three key differences between the nervous system and the endocrine system for control and coordination in animals.

14. In a cross between a pea plant with violet flowers (VV) and a pea plant with white flowers (vv):
(i) What will be the phenotype of the F1 generation?
(ii) If the F1 plants are self-pollinated, what will be the ratio of violet to white flowered plants in the F2 generation?
(iii) What is this type of cross, involving a single trait, called?

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15. The diagram below shows a schematic representation of blood circulation in humans.



A. Why is the circulation in humans referred to as 'double circulation'?

OR

B. Differentiate between pulmonary circulation and systemic circulation. C. Trace the flow of deoxygenated blood from the body tissues until it is oxygenated in the lungs.

16. A. (i) Draw a diagram to show regeneration in Planaria.
(ii) How is this process different from reproduction?
(iii) Name another organism that shows a high capacity for regeneration.

OR

B. (i) State the function of the following parts of the human female reproductive system:
(a) Ovary,
(b) Oviduct.
(ii) What is the placenta? List its two main functions.
(iii) What happens to the uterine wall if fertilization of the egg does not occur?

SECTION-B

17. The reaction between nitrogen and hydrogen to produce ammonia is represented as $x\mathrm{N}_2(\mathrm{g}) + y\mathrm{H}_2(\mathrm{g}) \rightarrow z\mathrm{NH}_3(\mathrm{g})$. The values of x, y, and z required to balance the equation are:
(a) x=1, y=3, z=2
(b) x=2, y=3, z=2
(c) x=1, y=2, z=3
(d) x=2, y=2, z=3

18. A solution turns red litmus paper blue. Its pH is likely to be:
(a) 1
(b) 4
(c) 5
(d) 10

19. Most non-metals are not lustrous. Which of the following non-metals possesses lustre?
(a) Sulphur
(b) Oxygen
(c) Nitrogen
(d) Iodine

20. Which of the following is considered a weak acid?
(a) Hydrochloric acid (HCl)
(b) Sulphuric acid (H_2SO_4)
(c) Acetic acid (CH_3COOH)
(d) Nitric acid (HNO_3)

21. Saturated hydrocarbons contain only carbon-carbon single bonds. Which of the following is a saturated hydrocarbon?
(a) Ethene (C_2H_4)
(b) Propyne (C_3H_4)
(c) Butane (C_4H_{10})
(d) Ethyne (C_2H_2)

22. To prevent the oil and fats in potato chips from getting oxidised, manufacturers fill the bags with which gas?
(a) Oxygen
(b) Hydrogen
(c) Nitrogen
(d) Carbon dioxide

23. Brass is an important alloy used in making decorative items and musical instruments. It is an alloy of:
(a) Copper and Tin
(b) Copper and Zinc
(c) Aluminium and Copper
(d) Lead and Tin

24. **Assertion (A) :** Butane and Propane are members of the same homologous series.
Reason (R) : Members of a homologous series have the same general formula and successive members differ by a $-CH_2$ group.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

25. Why is it recommended to clean a magnesium ribbon with sandpaper before burning it in air?

26. Attempt either option A or B.
(A) Explain the process of extracting mercury from its chief ore, cinnabar (HgS). Write balanced chemical equations for the reactions involved.

OR

(B) What are amphoteric oxides? Give an example of an amphoteric oxide and support your answer by writing one balanced chemical equation for its reaction with an acid and one with a base.

27. A student is given three solutions labelled A, B, and C with pH values of 4, 7, and 10, respectively. Answer the following questions:
(a) Which solution is neutral? Justify your answer.
(b) Which solution is alkaline?
(c) Arrange the three solutions in increasing order of their hydrogen ion (H^+) concentration.

28. A substance 'X', which is a yellowish-white powder, is used for disinfecting drinking water and for bleaching cotton in the textile industry. It is produced by the action of chlorine gas on dry slaked lime.
(a) Identify the substance 'X' and write its chemical formula.
(b) Write the balanced chemical equation for the preparation of 'X'.
(c) When 'X' is left exposed to air, it gradually loses its chlorine content. Why does this happen? Write a relevant chemical equation.

OR

(d) State any two uses of substance 'X' apart from those mentioned in the question.

29. Attempt either option A or B.

(A) (a) Write the IUPAC names for the following compounds: (i) $CH_3 - CH_2 - Br$ (ii) HCHO

(b) What is an addition reaction? Illustrate with the help of a balanced chemical equation.

(c) Why are addition reactions characteristic of unsaturated hydrocarbons?

OR

(b) (a) What is a substitution reaction?

(b) Give an example of a substitution reaction involving an alkane. Write the balanced chemical equation.

(c) Differentiate between soaps and detergents based on their chemical composition and their effectiveness in hard water.

SECTION-C

30. A student is studying the image formed by a plane mirror and makes the following statements:

I. The image formed is always virtual and erect.

II. The image is laterally inverted.

III. The size of the image is always smaller than the size of the object.

Choose from the following the correct option that lists the correct statements.

(a) I and II (b) I and III

(c) I, II and III (d) II and III

31. A person suffering from hypermetropia is unable to see nearby objects clearly. Which of the following correctly describes the reason for this defect?

(a) The image of a nearby object is formed in front of the retina.

(b) The image of a nearby object is formed on the retina.

(c) The image of a nearby object is formed behind the retina.

(d) The eye lens is a concave lens.

32. **Assertion (A) :** A ray of light passing through the focus of a convex lens becomes parallel to the principal axis after refraction.

Reason (R) : The principal focus is the point on the principal axis where all parallel rays converge after refraction.

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, and R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

33. An object 7 cm tall is placed 27 cm in front of a concave mirror of focal length 18 cm.

A. Calculate the image distance.

B. Find the size of the image.

C. State the nature of the image.

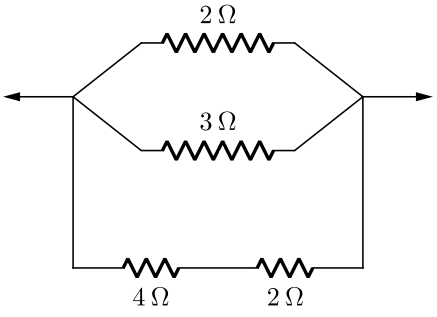
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34. Attempt either option A or B

A. Two resistors of resistances 3 Ω and 6 Ω respectively are connected to a battery of 6 V so as to have :
   (a) Maximum resistance,
   (b) Maximum current.
   (i) How will you connect the resistances in each case ?
   (ii) Calculate the strength of the current in the circuit in both cases.

OR

B. Calculate the equivalent resistance from the following combination of resistors.



35. What is dispersion of white light ? State it cause. Draw a ray diagram to show the dispersion of white light by a glass prism.

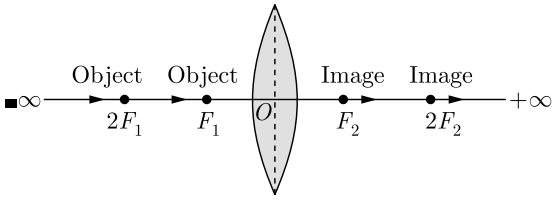
36. The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given below:

I (ampere)	0.5	1.0	2.0	3.0	4.0
V (volt)	1.6	3.4	6.7	10.2	13.2

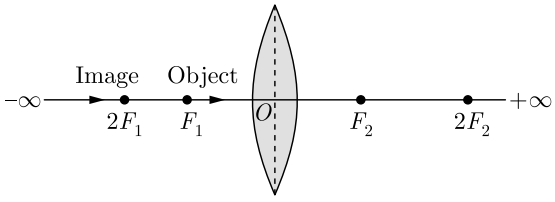
Plot a graph between V and I and calculate the resistance of the resistor.

37. A student states that a rainbow is formed due to reflection, refraction, and dispersion of sunlight by water droplets.
   (i) Is the statement correct?
   (ii) Explain briefly.

38. The image formed by a convex lens depends on the position of the object in front of the lens. When the object is placed anywhere between focus and infinity, the image formed by convex lens is real and inverted. The image is not obtained on the screen why the object is placed between the focus and the lens. The distance between the optical centre O of the convex lens and the focus point F_1 and F_2 is its focal length. When the object shifts from $-\infty$ to F_1, the image moves from F_2 to $+\infty$.



When the object shifts from F_1 to O, the image moves $-\infty$ to O.



A student did an experiment with a convex lens. He put an object at different distances from the lens. In each case, he measured the distance of the image from the lens. The results were recorded in the following table.

Object distance (in cm)	**Image distance (in cm)**
25	100
30	24
40	60
60	30
120	40

Unfortunately, his results are written in the wrong order.

(i) What is the focal length of this lens ?

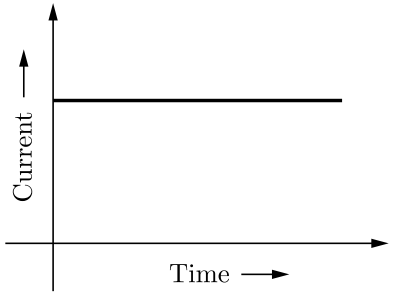
(ii) Rewrite the image distances in the correct order.

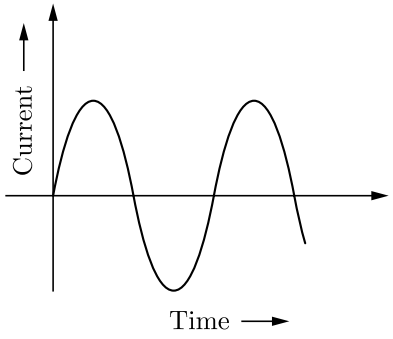
OR

(iii) What is the minimum distance between an object and its real image formed by a convex lens ?

39. Attempt either option A or B.

A. In our daily life we use two types of electric current whose current time graphs are given below :

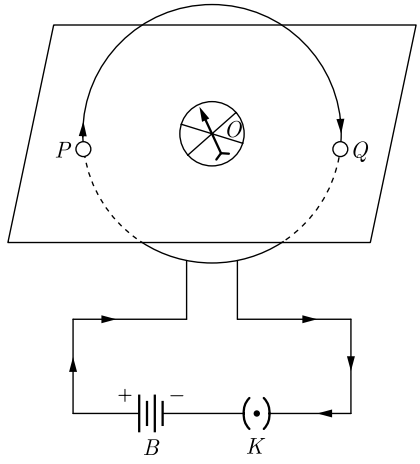




(i) Name the type of current in two cases.
(ii) Identify any one source for each type of current.
(iii) What is the frequency of current in case (b) in our country ?
(iv) On the basis of these graphs list two differences between the two currents.
(v) Out of the two which one is used in transmitting electric power over long distances and why ?

OR

B. The flow of current in a circular loop of wire creates a magnetic field at its center. How may existence of this field be detected ? State the rule which helps to predict the direction of this magnetic field.



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